

IN THE CLAIMS:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with ~~strikethrough~~. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

1. (PREVIOUSLY PRESENTED) A transmission line monitoring apparatus monitoring faults occurring in a transmission line and/or in an apparatus which are connected with the transmission line, said transmission line monitoring apparatus comprising:

a first optical coupling unit which couples a down data signal of a first wavelength and an examination signal of a second wavelength so as to transmit a first coupled signal to a lower apparatus;

a first optical dividing unit to demultiplex said first coupled signal from said optical coupling unit so as to divide and split said first coupled signal into said down data signal with the first wavelength and said examination signal with the second wavelength, said examination signal being returned;

a second optical coupling unit which couples an up data signal with the first wavelength and said returned examination signal from said first optical dividing unit so as to transmit a second coupled signal toward a host apparatus;

a second optical dividing unit to demultiplex said second coupled signal from said second optical coupling unit so as to divide and split said second coupled signal into said up data signal with the first wavelength and said returned examination signal with the second wavelength; and

a monitoring unit which monitors a fault and a location of said fault by using said examination signal with the second wavelength and determines whether said fault occurs in the transmission line and/or in the apparatus connected with the transmission line, and

where said first optical coupling unit, said first optical dividing unit, said second optical coupling unit and said second optical dividing unit are formed of passive elements that are operable without a power supply.

2. (CANCELLED)

3. (PREVIOUSLY PRESENTED) The transmission line monitoring apparatus as claimed in claim 1, further comprising a first examination signal generator which generates said examination signal with the second wavelength.

4. (ORIGINAL) The transmission line monitoring apparatus as claimed in claim 3, wherein said monitoring unit includes:

an alarm information output unit which monitors a signal level of said examination signal with the second wavelength and, if said signal level is lower than a predetermined signal level, then outputs alarm information; and

an alarm information displaying/transferring unit which, when said alarm information is outputted, displays said alarm information and insert said alarm information into said up data signal to be transmitted to said host apparatus.

5. (PREVIOUSLY PRESENTED) The transmission line monitoring apparatus as claimed in claim 1, further comprising:

an examination signal generator which divides an input down data signal into two signals, one signal being converted into said down data signal with the first wavelength, the other signal being converted into said examination signal with the second wavelength.

6. (PREVIOUSLY PRESENTED) A transmission line monitoring apparatus monitoring faults occurring in a transmission line and in apparatus which are connected with the transmission line, said transmission line monitoring apparatus comprising:

a first optical coupling unit which couples a down data signal of a first wavelength and an examination signal of a second wavelength so as to transmit a first coupled signal to a lower apparatus;

a first optical dividing unit to demultiplex said first coupled signal from said optical coupling unit so as to divide and split said first coupled signal into said down data signal with the first wavelength and said examination signal with the second wavelength;

a second optical coupling unit which couples an up data signal with the first wavelength and said examination signal from said first optical dividing unit so as to transmit a second coupled signal toward a host apparatus;

a second optical dividing unit to demultiplex said second coupled signal from said second optical coupling unit so as to divide and split said second coupled signal into said up data signal

with the first wavelength and said examination signal with the second wavelength;

a monitoring unit which monitors a fault and a location of said fault by using said examination signal with the second wavelength;

an examination signal generator which divides an input down data signal into two signals, one signal being converted into said down data signal with the first wavelength, the other signal being converted into said examination signal with the second wavelength;

an error information output unit which outputs synchronous error information and data signal error information based on said examination signal with the second wavelength; and

an error information displaying/transferring unit which, when said synchronous error information and said data signal error information are outputted, displays said error information and inserts said error information into said up data signal to be transmitted to said host apparatus, and

where said first optical coupling unit, said first optical dividing unit, said second optical coupling unit and said second optical dividing unit are formed of passive elements.

7. (PREVIOUSLY PRESENTED) A transmission line monitoring apparatus monitoring faults occurring in a transmission line and in apparatus which are connected with the transmission line, said transmission line monitoring apparatus comprising:

a first optical coupling unit which couples a down data signal of a first wavelength and an examination signal of a second wavelength so as to transmit a first coupled signal to a lower apparatus;

a first optical dividing unit to demultiplex said first coupled signal from said optical coupling unit so as to divide and split said first coupled signal into said down data signal with the first wavelength and said examination signal with the second wavelength;

a second optical coupling unit which couples an up data signal with the first wavelength and said examination signal from said first optical dividing unit so as to transmit a second coupled signal toward a host apparatus;

a second optical dividing unit to demultiplex said second coupled signal from said second optical coupling unit so as to divide and split said second coupled signal into said up data signal with the first wavelength and said examination signal with the second wavelength;

a monitoring unit which monitors a fault and a location of said fault by using said examination signal with the second wavelength;

a first examination signal generator which generates said examination signal with the

second wavelength; and

a first control unit which controls a start and stop of said first examination signal generator, and

where said first optical coupling unit, said first optical dividing unit, said second optical coupling unit and said second optical dividing unit are formed of passive elements.

8. (PREVIOUSLY PRESENTED) A transmission line monitoring apparatus monitoring faults occurring in a transmission line and in apparatus which are connected with the transmission line, said transmission line monitoring apparatus comprising:

a first optical coupling unit which couples a down data signal of a first wavelength and an examination signal of a second wavelength so as to transmit a first coupled signal to a lower apparatus;

a first optical dividing unit to demultiplex said first coupled signal from said optical coupling unit so as to divide and split said first coupled signal into said down data signal with the first wavelength and said examination signal with the second wavelength;

a second optical coupling unit which couples an up data signal with the first wavelength and said examination signal from said first optical dividing unit so as to transmit a second coupled signal toward a host apparatus;

a second optical dividing unit to demultiplex said second coupled signal from said second optical coupling unit so as to divide and split said second coupled signal into said up data signal with the first wavelength and said examination signal with the second wavelength;

a monitoring unit which monitors a fault and a location of said fault by using said examination signal with the second wavelength;

a first examination signal generator which generates said examination signal with the second wavelength; and

a second control unit which controls start and stop of said alarm information output unit and start and stop of said alarm information display/transferring unit, and

where said first optical coupling unit, said first optical dividing unit, said second optical coupling unit and said second optical dividing unit are formed of passive elements, and

wherein said monitoring unit includes:

an alarm information output unit which monitors a signal level of said examination signal with the second wavelength and, if said signal level is lower than a predetermined signal level, then outputs alarm information, and

an alarm information displaying/transferring unit which, when said alarm information is outputted, displays said alarm information and insert said alarm information into said up data signal to be transmitted to said host apparatus.

9. (ORIGINAL) The transmission line monitoring apparatus as claimed in claim 7, further comprising a timer for managing said first control unit at given intervals.

10. (ORIGINAL) The transmission line monitoring apparatus as claimed in claim 8; further comprising a command detecting unit which detects a command signal included in said down data signal so as to manage said first control unit based on said command signal.

11. (ORIGINAL) The transmission line monitoring apparatus as claimed in claim 9, further comprising a command detecting unit which detects a command signal included in said down data signal so as to manage said first control unit based on said command signal.

12. (PREVIOUSLY PRESENTED) A transmission line monitoring method monitoring faults occurring in a transmission line and/or in an apparatus connected with the transmission line, said transmission line monitoring method comprising:

coupling a down data signal with a first wavelength and an examination signal with a second wavelength so as to transmit a first coupled signal to a lower apparatus;

demultiplexing said first coupled signal into said down data signal with the first wavelength and said examination signal with the second wavelength, and returning said examination signal;

coupling an up data signal with the first wavelength and said returned examination signal with the second wavelength so as to transmit a second coupled signal towards a host apparatus;

demultiplexing the second coupled signal into said up data signal with the first wavelength and said returned examination signal with the second wavelength; and

monitoring a fault and a location of said fault by using said examination signal with the second wavelength and determining whether said fault occurs in the transmission line and/or in the apparatus connected with the transmission line, where the coupling and the demultiplexing operations are performed using a unit formed of passive elements that are operable without a power supply.

13. (PREVIOUSLY PRESENTED) A transmission line monitoring method monitoring faults occurring in a transmission line and/or in an apparatus connected with the transmission line, said transmission line monitoring method comprising:

generating an examination signal having a second wavelength from a data signal having a first wavelength;

coupling the data signal with the examination signal so as to transmit a first coupled signal from a host apparatus to a lower apparatus;

dividing and separating the first coupled signal into the data signal with the first wavelength and said examination signal with the second wavelength at the lower apparatus, and returning said examination signal;

coupling the data signal with the first wavelength and the returned examination signal with the second wavelength so as to transmit a second coupled signal from the lower apparatus to the host apparatus;

dividing and separating said second coupled signal into the data signal with the first wavelength and the returned examination signal with the second wavelength at the host apparatus; and

monitoring a fault and a location of the fault by using the examination signal with the second wavelength generated from the data signal having the first wavelength and determining whether said fault occurs in the transmission line and/or in the apparatus connected with the transmission line, where the coupling and the dividing operations are performed using a unit formed of passive elements that are operable without a power supply.

14. (PREVIOUSLY PRESENTED) A transmission line monitoring method monitoring faults occurring in a transmission line and/or in an apparatus connected with the transmission line, comprising:

controlling generation of an examination signal having a second wavelength and if the examination signal is generated, coupling a down data signal with a first wavelength to the examination signal with the second wavelength so as to transmit a first coupled signal to a lower apparatus;

separating the first coupled signal into said down data signal with the first wavelength and the examination signal with the second wavelength, and returning the examination signal;

coupling an up data signal with the first wavelength and the returned examination

signal with the second wavelength so as to transmit a second coupled signal to a host apparatus;

separating the second coupled signal into said up data signal with the first wavelength and said returned examination signal with the second wavelength; and

monitoring a fault and a location of said fault by using the examination signal with the second wavelength and determining whether said fault occurs in the transmission line and/or in the apparatus connected with the transmission line, where the coupling and the separating operations are performed using a unit formed of passive elements that are operable without a power supply.

15. (PREVIOUSLY PRESENTED) A transmission line monitoring method monitoring faults occurring in a transmission line and in apparatus connected with the transmission line, said transmission line monitoring method comprising:

transmitting a first coupled signal that includes a down data signal having a first wavelength and an examination signal having a second wavelength from a host apparatus to a lower apparatus, and returning the examination signal;

transmitting a second coupled signal that includes an up data signal with the first wavelength and the returned examination signal with the second wavelength from the lower apparatus to the host apparatus;

demultiplexing the first and the second coupled signals so as to split said first and second coupled signals; and

monitoring a fault and a location of said fault by using the examination signal with the second wavelength and determining whether said fault occurs in the transmission line and/or in the apparatus connected with the transmission line, where the coupling and demultiplexing operations are performed using a unit formed of passive elements that are operable without a power supply.

16. (PREVIOUSLY PRESENTED) A method for monitoring fault occurring in a transmission line and in an apparatus connected with the transmission line, comprising:

sending a coupled signal from a source location over a transmission line where the coupled signal includes a signal having a first wavelength and an examination signal having a second wavelength;

demultiplexing the coupled signal at a second location to divide and split the signal

having the first wavelength from the examination signal having the second wavelength;
returning the signal having the second wavelength to the source location over a second transmission line, the returned signal being coupled with a data signal from the apparatus; and monitoring a fault and a location of said fault using the returned signal having the second wavelength and determining whether said fault occurs in the transmission line and/or in the apparatus connected with the transmission line, where the coupling and the demultiplexing operations are performed using a unit formed of passive elements that are operable without a power supply.

17. (PREVIOUSLY PRESENTED) A transmission line monitoring method, comprising:
transmitting a first coupled signal having a data signal of a first wavelength and an examination signal of a second wavelength;
demultiplexing the first coupled signal to split the data signal with the first wavelength from the examination signal of the second wavelength, and return the examination signal of the second wavelength;
transmitting a second coupled signal having the data signal with the first wavelength and the returned examination signal of the second wavelength; and
demultiplexing the second coupled signal into the data signal with the first wavelength and the returned examination signal with the second wavelength, wherein a fault and a location of the fault is monitored using the examination signal with the second wavelength for determining whether said fault occurs in the transmission line and/or in an apparatus connected with the transmission line, where the coupling and the demultiplexing operations are performed using units formed of passive elements that are operable without a power supply.

18. (PREVIOUSLY PRESENTED) A method of monitoring a transmission line connecting a host apparatus with a terminal, comprising:
dividing a first coupled signal having a down data signal of a first wavelength and an examination signal of a second wavelength, and separately returning the examination signal of the second wavelength and at least a portion of the down data signal of the first wavelength;
inserting the returned portion of the down data signal into an up data signal with a first wavelength, and coupling the returned examination signal of the second wavelength with the up data signal to transmit a second coupled signal towards a host apparatus; and
dividing the second coupled signal into the up data signal with the first wavelength and

the examination signal with the second wavelength, where a fault is monitored and information indicative of whether the fault occurred in the transmission line, the terminal or the host apparatus is provided.

19. (PREVIOUSLY PRESENTED) The transmission line monitoring apparatus as claimed in claim 1, wherein said up data signal with the first wavelength includes at least a portion of said down data signal inserted therein.

20. (PREVIOUSLY PRESENTED) The transmission line monitoring method as claimed in claim 12, wherein said up data signal with the first wavelength includes at least a portion of said down data signal inserted therein.

21. (PREVIOUSLY PRESENTED) The transmission line monitoring method as claimed in claim 14, wherein said up data signal with the first wavelength includes at least a portion of said down data signal inserted therein.

22. (PREVIOUSLY PRESENTED) The transmission line monitoring method as claimed in claim 15, wherein said up data signal with the first wavelength includes at least a portion of said down data signal inserted therein.

23. (PREVIOUSLY PRESENTED) The method for monitoring fault as claimed in claim 16, wherein said returned signal is coupled with at least a portion of the signal having the first wavelength.

24. (PREVIOUSLY PRESENTED) The transmission line monitoring method as claimed in claim 17, wherein said second coupled signal includes another data signal with a first wavelength.